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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	
FRÖLICH, Sten et al	:	Docket: ANO 6187
Serial No. 09/923,096	:	Examiner: P. Chin
Filed: August 6, 2001	:	Group Art Unit: 1731

Title: A PROCESS FOR THE PRODUCTION OF PAPER

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. §1.132

Sir:

I, Fredrik Solhage, do hereby declare and say that:

(1) I am a citizen of Sweden residing at Sörmlandsgatan 26B, SE-504 39 Borås, Sweden. I am a research scientist employed by Eka Chemicals AB, since 1998 and since then I have been involved in the development of paper chemicals and, in particular, drainage and retention aids.

(2) I am a co-inventor of U.S. Patent Application Serial No. 09/923,096 (the present application) and I am familiar with the field of papermaking.

(3) I have read and understood the patent application Persson et al. (WO 9955964). I note that Persson et al. teaches the use of a cationic polysaccharide having a hydrophobic group (aromatic or aliphatic) in conjunction with anionic microparticles, preferably anionic silica-based particles, to improve retention and drainage.

(4) The following drainage performance tests, comparing a papermaking process according to the teachings of Persson et al. with a papermaking process according to the present application, have been conducted by me or under my direct supervision:

Drainage performance was evaluated by means of a Dynamic Drainage Analyser (DDA), available from Akribi, Sweden, which measures the time for draining a set volume of stock through a wire when removing a plug and applying vacuum to that side of the wire opposite to the side on which the stock is present.

A standard stock was prepared from a furnish based on 56% by weight of peroxide bleached TMP/SGW pulp (80/20), 14% by weight of bleached birch/pine sulphate pulp (60/40) refined to 200°CSF and 30% by weight of china clay. To the stock was added 25 g/l of a colloidal fraction, bleach water from a paper mill. Stock volume was 800 ml and pH about 7. Calcium chloride was added to the stock to adjust the conductivity to 0.5 mS/cm. Additional amounts of calcium chloride were added to the standard stock in order to prepare a high conductivity stock (5.0 mS/cm).

The additives to the stocks were a cationic polysaccharide and anionic polymer. The cationic polysaccharide used in the tests was prepared by generally known procedures by quarternisation of native potato starch with 3-chloro-2-hydroxypropyl dimethyl benzyl ammonium chloride to 0.5% N. The cationic polysaccharide is herein referred to as C.P..

In order to carry out a papermaking process according to the teachings of Persson et al., the cationic polysaccharide was used in conjunction with an anionic inorganic condensation polymer of silicic acid in the form of colloidal silica particles with a particle size of 5 nm, which is herein referred to as X1.

In order to carry out a papermaking process according to the present application, the cationic polysaccharide was used in conjunction with an anionic polymer having aromatic groups being a polycondensate of formaldehyde with naphthalene sulphonate, molecular weight about 20,000, which is herein referred to as X2.

The stock was stirred in a baffled jar at a speed of 1500 rpm throughout the test and chemicals additions were conducted as follows: i) adding cationic polysaccharide to the stock following by stirring for 30 seconds, ii) adding anionic polymer to the stock followed by stirring for 15 seconds, iii) draining the stock while automatically recording the drainage time.

The results of the papermaking process according to the teachings of Persson et al. are shown in Tables 1 and 3. The results of the papermaking process according to the present application are shown in Tables 2 and 4.

Table 1

Test No.	Conductivity mS/cm	C.P. Dosage [kg/t]	X1 Dosage [kg/t]	Dewatering time [s] C1
1	0.5	10	0.25	18.8
2	0.5	10	0.5	14.4

Table 2

Test No.	Conductivity mS/cm	C.P. Dosage [kg/t]	X2 Dosage [kg/t]	Dewatering time [s] C1
1	0.5	10	0.25	13.5
2	0.5	10	0.5	10.4

The results of the tests presented in Table 1 and 2 clearly shows that the drainage (dewatering) performance is considerably improved when the anionic polymer having an aromatic group (X2) is used compared to the anionic silica-based particles (X1).

Table 3

Test No.	Conductivity mS/cm	C.P. Dosage [kg/t]	X1 Dosage [kg/t]	Dewatering time [s] C1
1	5.0	20	2	17.9
2	5.0	20	3	17.3

Table 4

Test No.	Conductivity mS/cm	C.P. Dosage [kg/t]	X2 Dosage [kg/t]	Dewatering time [s] C1
1	5.0	20	2	12.0
2	5.0	20	3	10.7

The improvement in drainage (dewatering) performance when using an anionic polymer having an aromatic group (X2) instead of anionic silica-based particles (X1) is even more pronounced when a high conductivity stock is used.

(5) My conclusions of the tests are that the papermaking process according to the present application shows considerably improved drainage performance over the papermaking process according to the teachings of Persson et al.

(6) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Fredrik Solhage

2004-05-06
Date